PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/757,954	Examiner: Kaj K. Olsen
Applicants: Robert B. Grant et al.	Art Unit: 1795
Title: ELECTROCHEMICAL SENSOR	Confirmation No.: 5080
Filed: January 15, 2004	Atty. Docket No.: M03B330

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Dear Sir/Madam:

Applicants appeal the final rejections of all pending claims 1-6, 8, 11-15, 17, and 20. Claims 1-6, 8, 11-15, 17, and 20 are rejected under 35 USC 112, second paragraph. Claims 1, 2, 4-6, and 11-13 are rejected under 35 USC 103(a) as being unpatentable over US Patent No. 6,153,072 (Inoue), in view of US Patent No. 4,722,779 (Yamada), US Patent No. 4,882,033 (Shibata), and US Patent No. 5,827,415 (Gur).

BACKGROUND

The invention is directed to an organic molecular sensor. As illustrated in FIG. 1, the sensor includes a solid state oxygen anion conductor 12 coated with a measurement electrode 14 on one side, and a reference electrode 16 on the other side. In use, the measurement electrode 14 is exposed to a monitored environment 18, and the reference electrode 16 to a reference environment 20. Due to the oxygen pressure differential between the monitored and reference environments, a steady electrical potential across the conductor 12 can be measured. The organic contaminants present in the monitored environment 18 can consume oxygen, reduce the oxygen pressure in the monitored environment 18,

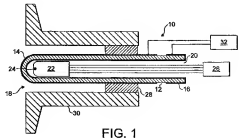


FIG. 1

and cause the electrical potential across the conductor 12 to change. By measuring the change of electrical potential, the quantity of the contaminants can be obtained.

ISSUES

The issues are 1) whether Examiner errs in rejecting independent claims 1 and 14 under 35 USC 112, second paragraph; and 2) whether Examiner errs in rejecting claims 1-6, 8, 11-15, 17, and 20 under 35 USC 103(a) as being unpatentable over Inoue, in view of Yamada, Shibata, and Gur.

DISCUSSION

I. Examiner errs in rejecting independent claims 1 and 14 under 35 USC 112, second paragraph.

A. The claim limitation that the reference environment is not formed by the solid state oxygen anion conductor is supported by the specification.

Although the reference environment recited in claims 1 and 14 is described in a negative term, there is nothing inherently ambiguous or uncertain about it as long as it is well defined in the specification. *See, MPEP 2173.05(i).* As shown in FIG. 1, the reference environment 20 designates the space surrounding the portion of conductor 12 unshielded by flange 30. Typical atmospheric air can be used as a gaseous source of oxygen for the reference environment 20. *See, the specification, page 8, line 30 – page 9, line 1.* The specification clearly supports the interpretation that the reference environment 20 is a surrounding to which the reference electrode 16 is exposed, instead of the conductor 12 that underlies the electrode 16.

B. The meaning of "the reference environment is not formed by the solid state oxygen anion conductor" is unambiguous.

Examiner asserts that "the reference environment is not formed by the solid state oxygen anion conductor" is ambiguous, because an alternative interpretation would read "form" as "define," and therefore the language would contradict the specification, which shows the conductor 12 as defining the boundary of the reference environment 20. *See, the Office Action, page 2, lines 15-22.*

As Examiner correctly points out that the specification does not support an interpretation that the conductor 12 does not partially define the boundary of the reference environment 20. However, it is Applicants' contention such interpretation

should not have been introduced to prove that the claim language is somewhat ambiguous in the first place. The pending claims must be given their broadest reasonable interpretation consistent with the specification. *In re Hyatt, 211 F.3d 1367 (Fed. Cir. 2000).* Since Examiner's interpretation is inconsistent with the specification, it does not fall in the scope of the claim. Applicants recognize that a negative limitation when read in isolation can have a myriad of interpretations by stretch of imagination. However, it is a well established principle that only the ones consistent with the specification can be given during examination of pending claims.

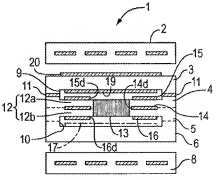
In addition, Examiner proposes another alternative interpretation of the claim language to the exclusion of desorption of oxygen from the reference electrode 16, and asserts that it is inconsistent with the specification. *See, the Office Action, page 3.* In spite of Examiner's position, such interpretation can be simply disregarded as outside the scope of the claims during examination. Again, there is nothing inherently ambiguous or uncertain about a negative limitation.

II. Examiner errs in rejecting claims 1-6, 8, 11-15, 17, and 20 under 35 USC 103(a) as being unpatentable over Inoue, in view of Yamada, Shibata, and Gur.

A. Inoue teaches away from replacing its solid electrolytes 4 and 5 with a different, external reference environment.

The objective of Inoue is to improve the accuracy of gas sensor by keeping the oxygen concentration of measured gas at a predetermined level. *See, col. 2, line 66 – col. 3 line 5.* As illustrated in FIG. 2, in operation, the gas to be measured is introduced in the first processing space 9 via a porous gas passage 11. *See, col. 19, lines 64-67.* The reference electrode 14, solid electrolyte 4, and measurement electrode 15 make up a first senor that measures the oxygen concentration in the first processing space 19. *See, col. 19, line 67 – col. 20, line 1.* If the oxygen concentration is too high (or too low), pump element 3 will pump oxygen out of (or into) the first processing space 19, in order to maintain the oxygen concentration therein at the predetermined level. *See, col. 20,*

FIG. 2



lines 1-19. The gas with adjusted oxygen concentration is then introduced into the second processing space 10 via a gas passage 13. *See, col. 20, lines 20-23.* Electrode 16 burns organic compounds and consumes oxygen in the second processing space 10, in which the amount of oxygen consumed is proportional to the amount of organic compounds burnt. *See, col. 20, lines 23-28.* The sensor constructed by the reference electrode 14, solid electrolyte 5, and measurement electrode 16 measures the oxygen concentration in the second processing space 10. *See, col. 20, lines 28-33.* The concentration of organic compound can be derived from the measured oxygen concentration. *See, col. 20, lines 34-37.* Because the oxygen concentration is kept at a known level in the first processing space 9, and the second processing space 10 is isolated from external environment, the derived data of organic compound concentration can be free from external influence, thereby improving the accuracy of sensor 1.

Unlike the claimed invention, solid electrolytes 4 and 5 surrounding the reference electrode 14 cannot be replaced with non-electrolyte material, such as atmospheric air. Inoue's sensor 1 includes two separate sub-sensors constructed by a stack of electrodes 15, 14, 16 and solid electrolytes 4 and 5. The reference electrode 14 is shared by two sub-sensors in a manner that it is sandwiched by the solid electrolytes 4 and 5. This differs from the claimed invention where one side of the reference electrode 16 is attached to the solid state oxygen anion conductor 12, and the other side of it is exposed to the reference environment 20 that is not formed by the conductor 12. Examples of the claimed reference environment include atmospheric air as discussed above. If one of Inoue's solid electrolytes 4 and 5 were replaced with the claimed reference environment, the sub-sensors would fail, and not be able to measure the oxygen concentration in the first or second processing space 9 or 10. Moreover, if the solid electrolyte 5 were replaced with the claimed reference environment, the oxygen concentration in the second processing space 10 would be subject to external influence, thereby defeating Inoue's purpose, which is to improve the sensor accuracy by keeping the oxygen concentration known and constant.

B. Inoue's deficiency cannot be cured by Yamada, Shibata, and Gur.

Examiner asserts the Yamada and Gur teach a reference environment other than a solid electrolyte that can be combined with Inoue. However, the mere fact that references

can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills, 916 F.2d 680 (Fed. Cir. 1990).* If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon, 733 F.2d 900 (Fed. Cir. 1984).* Modifying Inoue with Yamada and Gur as Examiner suggests would defeat the purpose of Inoue, for reasons discussed above. Thus, it is improper to make such modification simply because in abstract theory the references can be combined. It is Applicants' contention that Examiner has not met his burden of proof in establishing a prima facie case of obviousness.

CONCLUSION

As discussed above, independent claims 1 and 14 are definite under 35 USC 112, second paragraph, and not obvious over the cited references under 35 USC 103(a). Accordingly, claims 2-6, 8, 11-13, 15, 17, and 20 that depend from claims 1 and 14 and include all limitations recited therein are also patentable under sections 112 and 103. As such, Applicants respectfully request that the rejections be reversed and all pending claims allowed.

Respectfully submitted,

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